

REMARKS

Claims 1-5, 16-22, and 34-42 are pending. Claims 1-3, 5, 16-22, 34, and 35 have been amended. Claim 4 is original. Claims 36-42 are new. Claims 6-15 and 23-33 have been canceled. No new matter has been introduced by the amendment.

1. Summary Of The Present Invention As Illustrated By Below Embodiments

According to one embodiment of the present invention, it is provided "a composition of matter including a liquid continuous phase and a liquid discontinuous phase which is substantially immiscible in the continuous phase, characterised by the continuous phase *having a high electrical volume resistivity* and the discontinuous phase being *electrically charged*."

Specification at page 3, lines 8-12 (emphasis added).

According to another embodiment of the present invention, it is provided "a composition of matter including a liquid continuous phase, a liquid discontinuous phase which is substantially immiscible in the continuous phase and a surfactant, characterised by the continuous phase *having a high volume resistivity*, the discontinuous phase being *electrically charged* and the surfactant being selected to *not significantly reduce the volume resistivity of the continuous phase*." Specification at page 3, lines 19-24 (emphasis added).

"The term "not significantly reduce the volume resistivity" is intended to mean that the volume resistivity of the continuous phase of the emulsion is not reduced to such an extent that the electrical charge on the substrate or discontinuous phase is ineffective. In such a situation the discontinuous

In Reply to Non-Final Office Action Mailed March 30, 2010

phase may not deposit patternwise under the influence of an electrostatic field." Specification at page 3, lines 26-30.

"The term droplets is intended to refer to the various morphological forms of the discontinuous phase in an emulsion. It may include shapes other than spherical for instance cubic, cylindrical and lamellar." Specification at page 8, lines 20-22.

"Although the mechanism of *charging* of the emulsion droplets is not fully understood applicants believe that it relates to accumulation of polar or ionic species at the interface between the continuous and discontinuous phases. *Electrostatic charging of the emulsions* has been noted both with and without the use of charge control agents and surfactants." Specification at page 10, lines 15-19 (emphasis added).

"The electrical charge *on the droplets* of the discontinuous phase of the emulsions according to the present invention *maybe positive or negative*. Applicant has *produced both* depending upon the compositions selected." Specification at page 10, lines 21-23 (emphasis added).

"Numerous combinations have been tested to represent a range of continuous phases and discontinuous phases, their incompatibility and their ability to carry relevant materials for site-specific deposition and/or reaction." Specification at page 17, lines 10-12. Examples demonstrating how a charged emulsion according to various embodiments of the present invention would deposit on an oppositely charged substrate with an electrostatic pattern formed thereon are described on pages 17-35.

"It will be seen that by the use of emulsions of the present invention commercial fabrication at micrometre and nanometre scale by spatially selective deposition of chemical substances will be possible because of the

sizes of the droplets in the emulsions and their ability to carry deposition materials or reagents to selected sites." Specification at page 10, lines 10-13.

"The applicant has *surprisingly found* that by the use of electrically charged emulsions which include the chemical de-protecting agent in the discontinuous phase and which are selectively deposited on predefined areas of a planar or other shaped substrate under the influence of an electric field, then more accurate, localised and efficient de-protecting may be possible." Specification at page 3, lines 1-5 (emphasis added). In one example, a charged emulsion was shown to deposit on an oppositely charged substrate with an electrostatic pattern formed thereon. Surface regions as small as 50 microns across, the smallest feature attempted were dearly defined by dye deposition using the emulsion according to one embodiment of the present invention. Specification at page 29, line 12 to page 30, line 2.

2. Election/Restriction

The Applicant confirms the provisional election of Group I, claims 1-5, 16-22, and 34-35. The Applicant respectfully traverses this restriction.

As discussed in section 5 below, independent claims 1, 3, 34, and 35 in Group I are novel over the cited references. Similar features as recited in independent claims 1, 3, 34, and 35 in Group I are found in all other independent claims in Groups II and III. Accordingly, the Applicant respectfully submits that Groups I, II, and III contain common special technical features, and that the restriction requirement should be withdrawn.

3. Claim Objections

Claims 1-3, 5, 16-18, 34, and 35 have been objected to because of informalities. Claims 1-3, 5, 16-18, 34, and 35 have been amended as

suggested by the Examiner. The Applicant respectfully submits that the objection to claims 1-3, 5, 16-18, 34, and 35 has been overcome and should be withdrawn.

4. Claim Rejections under 35 U.S.C. § 112, Second Paragraph

Claims 16-22 have been rejected under 35 U.S.C. § 112, second paragraph. Claims 16-22 have been amended. The Applicant respectfully submits that the rejection of claims 16-22 has been overcome and should be withdrawn.

5. Claim Rejections under 35 U.S.C. § 102(b) And § 103(a)

A. Independent Claim 1 And Its Dependent Claim

1) Claim Rejection under 35 U.S.C. § 102(b) over Clancy

Claims 1 and 2 have been rejected under 35 U.S.C. § 102(b) over Clancy (U.S. Pat. No. 3,347,702). The Applicant respectfully traverses this rejection.

The Examiner asserted that Clancy discloses a composition comprising water and Triton X-400 that “reads on electrically charged reagent” “forming a water-in-oil emulsion” (Office Action, page 5). First, claim 1 recites “the discontinuous phase [] is electrically charged”. Claim 1 does not recite “electrically charged reagent” as asserted by the Examiner. Also, there is no teaching in Clancy indicating that the discontinuous phase (water in the water-in-oil emulsion) of Clancy is electrically charged. It may well be the case that the discontinuous phase of Clancy has neutral charges on the droplets, in other words, not electrically charged. The Applicant hereby respectfully requests that the Examiner either provide support for the position that the discontinuous phase (water in the water-in-oil emulsion) of Clancy is

electrically charged, or withdraw the rejection. Moreover, to the extent that the coating of Clancy formed from the emulsion is charged for further processing, it means exactly that – the coating, but not the emulsion, is charged. See column 4, lines 46-54; and Fig. 4.

In view of the above, the Applicant respectfully submits that Clancy would not anticipate independent claim 1. Accordingly, the rejection of independent claim 1 is improper and should be withdrawn.

Moreover, dependent claim 2 is patentable since it depends from the patentable independent claim 1.

2) Claim Rejection under 35 U.S.C. § 102(b) over Sertorio

Claims 1 and 2 have been rejected under 35 U.S.C. § 102(b) over Sertorio (U.S. Pat. No. 2,828,180). The Applicant respectfully traverses this rejection.

The Examiner asserted that Sertorio discloses "a water-in-oil dyestuff emulsion comprising continuous phase naphtha (read on having high electrical volume resistivity), discontinuous water phase and electrically charged [reagent] sodium formaldehyde sulphoxylate (Example 20A)" (Office Action, page 6). First, claim 1 recites "the discontinuous phase [] is electrically charged". Claim 1 does not recite "electrically charged reagent" as asserted by the Examiner.

Further, Sertorio expressly discloses an emulsion, in Example 20A on column 11, comprising "*10 parts* solvent naphtha, *12 parts* sodium formaldehyde sulphoxylate, *12 parts* potassium carbonate, *60.5 parts* water" (emphasis added). A person having ordinary skill in the art would appreciate that water is the continuous phase and naphtha is the discontinuous phase in the Sertorio emulsion. There is no teaching in Sertorio indicating that the

naphtha discontinuous phase of Sertorio is electrically charged. It may well be the case that the naphtha discontinuous phase of Sertorio has neutral charges on the droplets, in other words, not electrically charged. Also, there is no teaching in Sertorio indicating that the water continuous phase of Sertorio has a high electrical volume resistivity. Indeed, a person having ordinary skill in the art would appreciate that water typically has a low electrical volume resistivity. The Applicant hereby respectfully requests that the Examiner either provide support for the positions that the naphtha discontinuous phase of Sertorio is electrically charged and that the water continuous phase of Sertorio has a high electrical volume resistivity, or withdraw the rejection.

In view of the above, the Applicant respectfully submits that Sertorio would not anticipate independent claim 1. Accordingly, the rejection of independent claim 1 is improper and should be withdrawn.

Moreover, dependent claim 2 is patentable since it depends from the patentable independent claim 1.

B. Independent Claim 3 And Its Dependent Claims

1) Claim Rejection under 35 U.S.C. § 102(b) over Clancy

Claims 3-5 and 20-22 have been rejected under 35 U.S.C. § 102(b) over Clancy. The Applicant respectfully traverses this rejection.

First, as discussed in section 5.A.1), Clancy does not teach an electrically charged discontinuous phase, as required by independent claim 3.

Moreover, there is no teaching in Clancy as to whether Triton X-400 of Clancy significantly reduces the volume resistivity of the continuous phase

(benzene with significant amount of ethyl cellulose dissolved therein) or not. See, for example, Example 3 on columns 7 and 8.

In view of the above, the Applicant respectfully submits that Clancy would not anticipate independent claim 3. Accordingly, the rejection of independent claim 3 is improper and should be withdrawn.

Moreover, the dependent claims are patentable since they depend from the patentable independent claim 3. In addition, the Examiner fails to show how the further limitations recited in the dependent claims would be anticipated by Clancy.

For example, regarding claim 22, the Examiner generally asserted that Clancy discloses particle size < 0.5 microns (Office Action, page 5). The Examiner, however, did not assert that Clancy specifically discloses any droplet size from about 200 nanometres down to 1 nanometre, as required by dependent claim 22.

2) Claim Rejection under 35 U.S.C. § 102(b) over Sertorio

Claims 3-5 and 16-17 have been rejected under 35 U.S.C. § 102(b) over Sertorio. Claim 18 has been rejected under 35 U.S.C. § 103(a) over Sertorio. The Applicant respectfully traverses this rejection.

First, as discussed in section 5.A.2), Sertorio does not teach an electrically charged discontinuous phase and a continuous phase having a high volume resistivity, as required by independent claim 3.

Moreover, the Examiner merely asserted that Sertorio discloses a non-ionic surfactant that "would not significantly reduce the volume resistivity of the continuous phase", without referring to any specific teachings in the Sertorio specification to support the assertion. As discussed in section 5.A.2),

the continuous phase of the Sertorio emulsion is water. There is no teaching in Sertorio that the surfactant would not significantly reduce the volume resistivity of the water continuous phase. Indeed, in aqueous systems, it is an irrelevant consideration – the volume resistivity in aqueous systems would be low anyway, either in the presence or absence of the surfactant.

In view of the above, the Applicant respectfully submits that Sertorio would not anticipate independent claim 3. Accordingly, the rejection of independent claim 3 is improper and should be withdrawn.

Moreover, the dependent claims are patentable since they depend from the patentable independent claim 3.

3) Claim 19

The Applicant notes that claim 19 is patentable under 35 U.S.C. § 102 and under 35 U.S.C. § 103.

C. Independent Claim 34

1) Claim Rejection under 35 U.S.C. § 102(b) over Sertorio

Claim 34 has been rejected under 35 U.S.C. § 102(b) over Sertorio. The Applicant respectfully traverses this rejection.

First, as discussed in section 5.A.2), Sertorio does not teach an electrically charged discontinuous phase and a continuous phase having a high volume resistivity, as required by independent claim 34.

Moreover, as discussed in section 5.B.2), Sertorio does not teach a surfactant that does not significantly reduce the volume resistivity of the continuous phase, as required by independent claim 34.

In view of the above, the Applicant respectfully submits that Sertorio would not anticipate independent claim 34. Accordingly, the rejection of independent claim 34 is improper and should be withdrawn.

2) Claim Rejection under 35 U.S.C. § 102(b), or in the alternative, under 35 U.S.C. § 103(a), over Clancy

Claim 34 has been rejected under 35 U.S.C. § 102(b), or in the alternative, under 35 U.S.C. § 103(a), over Clancy. The Applicant respectfully traverses this rejection.

First, as discussed in section 5.A.1), Clancy does not teach an electrically charged discontinuous phase, as required by independent claim 34.

Moreover, as discussed in section 5.B.1), Clancy does not teach a surfactant that does not significantly reduce the volume resistivity of the continuous phase, as required by independent claim 34.

In view of the above, the Applicant respectfully submits that Clancy would not anticipate independent claim 34. Accordingly, the rejection of independent claim 34 under 35 U.S.C. § 102(b) is improper and should be withdrawn.

Further, the Examiner has conceded that different surfactants are used in the instant application (Triton X-100) and in Clancy (Triton X-400) (Office Action, page 9). Moreover, these different surfactants are used with different other components to form different emulsions. According to one embodiment of the instant application, an emulsion comprises 0.25 volume % of Triton X-100, 0.25 volume % of disulphine blue, and 99.5 volume percent of toluene. Specification at page 22, lines 4-11. In contrast, the emulsion of Clancy comprises *41 g of ethyl cellulose dissolved in 650 cc. of benzene, 1.9 g of*

Triton X-400, 206 g of zinc oxide, and water. Clancy specification at columns 7 and 8, Example 3. The Applicant respectfully submits that the compositions of the Clancy emulsion is so different from the emulsion according to one embodiment of the instant application that there lacks a sound basis for believing that the products of the applicant and the prior art are the same.

In view of the above, the Applicant respectfully submits that Clancy would not render independent claim 34 obvious. Accordingly, the rejection of independent claim 34 under 35 U.S.C. § 103(a) is improper and should be withdrawn.

D. Independent Claim 35

1) Claim Rejection under 35 U.S.C. § 102(b) over Clancy

Claim 35 has been rejected under 35 U.S.C. § 102(b) over Clancy. The Applicant respectfully traverses this rejection.

As discussed in section 5.A.1), Clancy does not teach an electrically charged discontinuous phase, as required by independent claim 35.

In view of the above, the Applicant respectfully submits that Clancy would not anticipate independent claim 35. Accordingly, the rejection of independent claim 35 is improper and should be withdrawn.

2) Claim Rejection under 35 U.S.C. § 102(b) over Sertorio

Claim 35 has been rejected under 35 U.S.C. § 102(b) over Sertorio. The Applicant respectfully traverses this rejection.

As discussed in section 5.A.2), Sertorio does not teach an electrically charged discontinuous phase and a continuous phase having a high volume resistivity, as required by independent claim 35.

In view of the above, the Applicant respectfully submits that Sertorio would not anticipate independent claim 35. Accordingly, the rejection of independent claim 35 is improper and should be withdrawn.

6. New Claims 36-42

Claims 36-42 are new. Support for new claims 36-38 can be found in the Applicant's specification, for example, in original claims 18 and 19. Support for new claims 39-42 can be found in the Applicant's specification, for example, on page 16, lines 5-9.

7. Conclusion

Based on the above, the Applicant respectfully submits that the claims are in condition for allowance. If any issues remain, the Examiner is kindly invited to contact the undersigned attorney to expedite allowance.

Respectfully submitted,

Date: June 30, 2010

/Yuezhong Feng/
Yuezhong Feng, Ph.D.
Registration No. 58,657
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610
(312) 321-4200